PATENT

In the United States Patent and Trademark Office

Applicant: E. Wies et al.
Applicant's Ref: IMM062C
Application No: Unassigned
Filed: March 5, 2002
Title: Defining Force Sensations Associated with Graphical Images (as amended)

Examiner: M. Geckil
Group Art Unit: 2756

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please amend the above-identified patent application as follows before the examination of the application:

In the Title:

Please delete the Title and replace with: -- Defining Force Sensations Associated with Graphical Images --.

CLEAN VERSION OF AMENDMENTS

In the Specification:

Delete the paragraph starting on Page 1, line 16, and replace with:

This is a continuation application of copending prior U.S. Application No. 09/649,723, filed August 28, 2000, which is a continuation of U.S. Application No. 09/244,622, now U.S. Patent No. 6,161,126, filed on February 2, 1999, which 1) is a continuation-in-part of copending U.S. Application

No. 08/691,852, now Patent No. 5,956,484, filed August 1, 1996, which is a continuation-in-part of U.S. Patent Application No. 08/571,606, now Patent No. 6,219,032, filed December 13, 1995; 2) is a continuation-in-part of Application No. 08/970,953, now Patent No. 6,300,936, filed November 14, 1997; and 3) claims priority to U.S. Provisional patent application no. 60/073,518, filed February 3, 1998; the disclosures of which are all incorporated herein by reference.

Replace the paragraph starting on Page 12, line 19, with:

The hardware architecture described above is also described in co-pending U.S. patent 5,739,811, filed 11/28/95, the disclosure of which is incorporated herein by reference. The high level command protocol between the computer and the force feedback device is also described in U.S. patent 5,734,373, filed 12/1/95, the disclosure of which is incorporated herein by reference. Force feedback as implemented in a graphical user interface is described in U.S. patent application no. 08/571,606, now Patent No. 6,219,032, filed Dec. 13, 1995, and incorporated herein by reference.

Replace the paragraph starting on Page 15, line 10, with:

Transducer system 150 also preferably includes actuators 154 to transmit forces to mouse 36 in space, i.e., in two (or more) degrees of freedom of the user object. The bottom housing plate 157 of actuator 154a is rigidly coupled to ground member 132 (or grounded surface 124) which includes, e.g. a magnet, and a moving portion of actuator 154a (e.g. a wire coil) is integrated into the base member 134. The actuator 154a transmits rotational forces to base member 134 about axis A. The housing 157 of the grounded portion of actuator 154b is coupled to ground member 132 or ground surface 124 through the grounded housing of actuator 154b, and a moving portion (e.g. a coil) of actuator 154b is integrated into base member 138. Actuator 154b transmits rotational forces to link member 138 about axis A. The combination of these rotational forces about axis A allows forces to be transmitted to mouse 36 in all directions in the planar workspace provided by linkage 130 through the rotational interaction of the members of linkage 130. The operation of the electromagnetic actuators 154 is described in greater detail in Patent Nos. 6,100,874 and 6,166,723. In other embodiments, other types of actuators, such as electrical DC motors, can be used. A different embodiment of a force feedback device can include flexure members to allow movement in provided degrees of freedom.

Replace the paragraph starting on Page 18, line 5, with:

Generic effects and authored effects are preferably composed from a basic set of stock force effects. The stock effects include vector forces, vibrations, springs, textures, and others, as described in Patent Nos. 5,825,308; 6,219,032; 5,959,613; 6,147,674; and 6,078,308, all incorporated by

reference herein. Effects of differing complexity can be provided as stock effects; for example, a primitive effect such as a simple vector force to be output in a specified direction at a specified magnitude can be provided, or a more complex effect that includes multiple primitive effects can be provided. One particularly significant, more complex effect is the enclosure. An enclosure is a set of forces that occur only when the cursor is in or near a geometrically bounded ("enclosed") area of the screen. Enclosures can be associated with forces at their borders to attract the cursor to the inside of the bounded area, keep the cursor outside the bounded area, or attract the cursor to the border surrounding the bounded area. The enclosure may take a variety of shapes, for example rectangular or elliptical, and may also be associated with one or more other force effects when the cursor or pointer is positioned inside the enclosure. Examples of force effects that can be provided and programmed are specified in the FEELit Application Programming Interface (API) from Immersion Corporation of San Jose, CA., detailed in patent application no. 08/970,953, now Patent No. 6,300,936, filed 11/14/97, and incorporated by reference herein.

Replace the paragraph starting on Page 45, line 34, with:

FIGURES 19a, 19b, and 19c illustrate examples of force sensation design interfaces that can be displayed to edit the force effects for an object in the HTML editor. Alternatively, a separate force design application, such as I-Force Studio, can be run if the user wishes to modify or create a force effect. The shown interface windows are similar to the force sensation design tools provided in I-FORCE Studio® available from Immersion Corporation. These design tools provide a fully animated graphical environment for rapidly adjusting physical parameters of feel sensations, and then optionally saving them as "feel resources." Authors may craft tactile feel sensations by stretching springs, manipulating surfaces, placing liquids, and adjusting other graphical representations and physical metaphors that represent each associated force feedback phenomenon. The design tools also empower end users with the ability to edit the "feel resource" using the same intuitive animated graphical controls used by the web page author. A user with no programming experience or familiarity with force feedback can quickly design high-fidelity, compelling sensations using these design tools. Such graphical manipulation for design of force effects is described in greater detail in U.S. Patents 6,147,674 and 6,169,540, both incorporated herein by reference.

In the Claims:

Claims which have been changed by this amendment are presented below and are labeled as "amended." A marked up version of the amended claims follows the Remarks section.

Please cancel claims 1-56 without prejudice.

Please add the following claims:

57. (new) A method for defining force sensations for a haptic feedback interface device, the method comprising:

causing an image to be displayed on a display device, said display device coupled to a computer; and

receiving input from a user, said input providing a displayed graphical designation on said image, said displayed graphical designation spatially designating an area of said image, said area to be associated with at least one force effect selected by said user, said at least one selected force effect to be output as a force sensation by said haptic feedback interface device, said haptic feedback interface device including a user manipulatable object graspable and moveable by a user of said haptic feedback interface device.

58. (new) A method as recited in claim 57 wherein said at least one associated force effect is to be output when a user of said force feedback interface device moves a user-controlled cursor over a location on said image correlated with said area designated by said graphical designation.

59. (new) A method as recited in claim 57 wherein said image is an image of a web page object to be displayed on a web page downloaded over a network to a client machine, and wherein said haptic feedback interface device is in communication with said client machine.

60. (new) A method as recited in claim 59 wherein said at least one selected force effect is to be commanded by said client machine receiving said web page and to be output as said force sensation by said haptic feedback interface device.

61. (new) A method as recited in claim 59 wherein said area of said image is said entire web page object.

62. (new) A method as recited in claim 59 wherein said displayed graphical designation includes a graphical outline encompassing said area of said image.

63. (new) A method as recited in claim 62 wherein said area is a portion of said image, said portion not including an entire area of said image.

64. (new) A method as recited in claim 62 wherein said selected force effect associated with said graphical outline includes a texture effect, said texture effect to be output when a user-controlled cursor moves within an interior region of said outline.

65. (new) A method as recited in claim 62 wherein said displayed graphical designation includes a graphical line displayed on said area of said image, wherein said selected force effect associated with said graphical line includes a barrier force resisting motion of said interface device that causes said user-controlled cursor through said graphical line.

66. (new) A method as recited in claim 57 wherein said input from said user is input using a user interface tool that creates said graphical designation.

67. (new) A method as recited in claim 57 wherein said image is a two-dimensional pictorial image or text.

68. (new) A method as recited in claim 60 wherein said graphical designation is visually perceptible by said user providing said input and is visually invisible to a user of said haptic feedback interface device.

69. (new) A method as recited in claim 57 wherein said at least one selected force effect is output as a force sensation to said user of said client machine when said user moves a cursor over said graphical designation.

70. (new) An apparatus for defining force sensations for a haptic feedback interface device, the apparatus comprising:

means for causing an image to be displayed on a display device, said display device coupled to a computer;

means for receiving input from a user, said input providing a displayed graphical designation on said image, said displayed graphical designation spatially designating an area of said image; and

means for associating said area with at least one force effect selected by said user, said at least one selected force effect to be output as a force sensation by said haptic feedback interface device, said haptic feedback interface device including a user manipulatable object graspable and moveable by a user of said haptic feedback interface device.

71. (new) An apparatus as recited in claim 70 wherein said at least one associated force effect is to be output when a user of said force feedback interface device moves a user-controlled cursor over a location on said image correlated with said area designated by said graphical designation.

72. (new) An apparatus as recited in claim 70 wherein said apparatus is a client machine, and wherein said image is an image of a web page object to be displayed on a web page downloaded over a network from a server machine to said client machine, and wherein said haptic feedback interface device is in communication with said client machine.

73. (new) An apparatus as recited in claim 72 wherein said displayed graphical designation includes a graphical outline encompassing said area of said image.

74. (new) An apparatus as recited in claim 73 wherein said area is a portion of said image, said portion not including an entire area of said image.

75. (new) An apparatus as recited in claim 73 wherein said selected force effect associated with said graphical outline includes a texture effect, said texture effect to be output when a user-controlled cursor moves within an interior region of said outline.

76. (new) An apparatus as recited in claim 73 wherein said displayed graphical designation includes a graphical line displayed on said area of said image, wherein said selected force effect associated with said graphical line includes a barrier force resisting motion of said interface device that causes said user-controlled cursor through said graphical line.

77. (new) A computer readable medium including program instructions to be implemented on a computer, said program instructions performing steps comprising:

causing an image to be displayed on a display device, said display device coupled to a computer; and

receiving input from a user, said input providing a displayed graphical designation on said image, said displayed graphical designation spatially designating an area of said image, said area to be associated with at least one force effect selected by said user, said at least one selected force effect to be output as a force sensation by said haptic feedback interface device, said haptic feedback interface device including a user manipulatable object graspable and moveable by a user of said haptic feedback interface device.

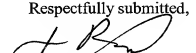
78. (new) A computer readable medium as recited in claim 77 wherein said image is a web page object to be displayed in a web page, wherein said input from said user is received using a graphical tool implemented in a force-enabled web page authoring interface running on said computer.

REMARKS

Claims 57-78 are pending in this application. Claims 1-56 have been cancelled and claims 57-78 have been added by this amendment. Applicant has amended the specification as indicated above to update application numbers with patent numbers. In addition, a copy of the Appendices provided on microfiche is submitted herewith.

Applicant respectfully requests a notice of allowance from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,



James R. Riegel
Reg. 36,651

San Jose, CA
408-467-1900

MARKED UP VERSION OF AMENDMENTS

In the Specification:

Delete the paragraph starting on Page 1, line 16, and replace with:

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[The present application claims the benefit of Provisional Patent Application serial. no. 60/073,518, filed February 3, 1998 by Wies et al., entitled, "Implementing Force Feedback Over a Computer Network"; and the present application is a continuation-in-part of U.S. Patent Application Serial No. 08/691,852, entitled "Method and Apparatus for Providing Force Feedback over a Computer Network," filed August 1, 1996 by Rosenberg et al., both of which are incorporated herein by reference for all purposes.]

Replace the paragraph starting on Page 12, line 19, with:

The hardware architecture described above is also described in co-pending U.S. patent 5,739,811, filed 11/28/95, the disclosure of which is incorporated herein by reference. The high level command protocol between the computer and the force feedback device is also described in U.S. patent 5,734,373, filed 12/1/95, the disclosure of which is incorporated herein by reference. Force feedback as implemented in a graphical user interface is described in U.S. patent application [serial] no. 08/571,606, now Patent No. 6,219,032, filed Dec. 13, 1995, and incorporated herein by reference.

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Replace the paragraph starting on Page 18, line 5, with:

Generic effects and authored effects are preferably composed from a basic set of stock force effects. The stock effects include vector forces, vibrations, springs, textures, and others, as described in Patent [No.] Nos. 5,825,308; 6,219,032; 5,959,613; 6,147,674; and 6,078,308, [and co-pending patent applications 08/571,606, 08/747,841, 08/846,011 and 08/879,296,] all incorporated by reference herein. Effects of differing complexity can be provided as stock effects; for example, a primitive effect such as a simple vector force to be output in a specified direction at a specified magnitude can be provided, or a more complex effect that includes multiple primitive effects can be provided. One particularly significant, more complex effect is the enclosure. An enclosure is a set of forces that occur only when the cursor is in or near a geometrically bounded ("enclosed") area of the screen. Enclosures can be associated with forces at their borders to attract the cursor to the inside of the bounded area, keep the cursor outside the bounded area, or attract the cursor to the border surrounding the bounded area. The enclosure may take a variety of shapes, for example rectangular or elliptical, and may also be associated with one or more other force effects when the cursor or pointer is positioned inside the enclosure. Examples of force effects that can be provided and programmed are specified in the FEELit Application Programming Interface (API) from Immersion Corporation of San Jose, CA., detailed in patent application [serial] no. 08/970,953, now Patent No. 6,300,936, filed 11/14/97, [Docket no. IMM1P035, entitled, "Force Feedback System Including Multi-Tasking Graphical Host Environment and Interface Device"] and incorporated by reference herein.

Replace the paragraph starting on Page 45, line 34, with:

FIGURES 19a, 19b, and 19c illustrate examples of force sensation design interfaces that can be displayed to edit the force effects for an object in the HTML editor. Alternatively, a separate force design application, such as I-Force Studio, can be run if the user wishes to modify or create a force effect. The shown interface windows are similar to the force sensation design tools provided in I-FORCE Studio® available from Immersion Corporation. These design tools provide a fully animated graphical environment for rapidly adjusting physical parameters of feel sensations, and then optionally saving them as "feel resources." Authors may craft tactile feel sensations by stretching springs, manipulating surfaces, placing liquids, and adjusting other graphical representations and physical metaphors that represent each associated force feedback phenomenon. The design tools also empower end users with the ability to edit the "feel resource" using the same intuitive animated graphical controls used by the web page author. A user with no programming experience or familiarity with force feedback can quickly design high-fidelity, compelling sensations using these design tools. Such graphical manipulation for design of force effects is described in greater detail in [copending patent applications serial nos. 08/846,011, filed 4/25/97, and 08/877,114, filed 6/17/97,] U.S. Patents 6,147,674 and 6,169,540, both incorporated herein by reference.